

## ABSTRACT

A method to provide active noise control to reduce noise and vibration in reverberant acoustic enclosures such as aircraft, vehicles, appliances, instruments, industrial equipment and the like is presented. A continuous-time multi-input multi-output (MIMO) state space mathematical model of the plant is obtained via analytical modeling and system identification. Compensation is designed to render the mathematical model passive in the sense of mathematical system theory. The compensated system is checked to ensure robustness of the passive property of the plant. The check ensures that the passivity is preserved if the mathematical model parameters are perturbed from nominal values. A passivity-based controller is designed and verified using numerical simulations and then tested. The controller is designed so that the resulting closed-loop response shows the desired noise reduction.